REMARKS

Claims 1-3, 7-15, and 19-25 are pending in the present application. Claims 4-6 and 16-18 are canceled; and claims 1, 3, 8-9, 13, 15, 20-21, and 25 are amended. Support for the amendments to the claims is located at least on page 4, lines 3-19; on page 10, line 18, through page 11, line 8; on page 21, line 11, through page 23, line 17; on page 24, line 12, through page 25, line 21; and in **Figures 4A-4F** and **Figures 6** and **7**. Reconsideration of the claims is respectfully requested.

I. 35 U.S.C. § 102, Anticipation

The Examiner has rejected claims 1, 2, 7, 13, 14, 19, and 25 under 35 U.S.C. § 102(e) as being anticipated by *Yamanishi et al.* (U.S. Patent No. 7,333,923), hereinafter referred to as *Yamanishi*. This rejection is respectfully traversed.

With respect to independent claims 1, 13, and 25, the Examiner states:

> **Regarding Claims 1, 13, 25.**
> Yamanishi teaches a method, in a data processing system, for detecting fraud, the method comprising:
> receiving a set of historical data; (Summary of the Invention)
> identifying a plurality of control points in the historical data; (Summary of the Invention)
> building at least one data model based on the plurality of control points; (Summary of the Invention)
> receiving a set of updated data; (Summary of the Invention)
> identifying one or more new control points based on the updated data; (Summary of the Invention)
> adjusting the at least one data model to form an adjusted date model, within the at least one data model, based on the one or more new control points, wherein the at least one data model is refined for a plurality of iterations; (Summary of the Invention)
> verifying a transaction based on the adjusted data model. (See Col 1 Lines 18-25)

Final Office Action dated June 30, 2008, pages 2-3.

As amended, claim 1, which is representative of the other rejected independent claim 13 and 25 with regard to similarly recited subject matter, reads as follows:

> 1. A method, in a data processing system, for detecting fraud, the method comprising:
> receiving a set of historical data;

identifying a plurality of control points in the historical data, further comprising:

identifying a plurality of outliers in a distribution of the historical data; and

validating the plurality of outliers to distinguish between a first set of outliers and a second set of outliers, wherein the first set of outliers are classified as valid outliers and the second set of outliers are classified as invalid outliers, and wherein the first set of outliers are identified as the plurality of control points;

building at least one data model based on the plurality of control points, further comprising:

generating a fence that passes through the plurality of control points to define a boundary between data points, wherein data points within the fence represent acceptable behavior and data points outside the fence represent fraudulent behavior;

receiving a set of updated data;

identifying one or more new control points based on the updated data, further comprising:

identifying an additional plurality of outliers in a distribution of the updated data; and

validating the additional plurality of outliers to distinguish between a third set of outliers and a fourth set of outliers, wherein the third set of outliers are classified as valid outliers and the fourth set of outliers are classified as invalid outliers, and wherein the third set of outliers are identified as the one or more new control points;

adjusting the at least one data model to form an adjusted data model, within the at least one data model, based on the one or more new control points, wherein the at least one data model is refined for a plurality of iterations; and

verifying a transaction based on the adjusted data model.

A prior art reference anticipates the claimed invention under 35 U.S.C. § 102 only if every element of a claimed invention is identically shown in that single reference, arranged as they are in the claims. *In re Bond*, 910 F.2d 831, 832, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990). All limitations of the claimed invention must be considered when determining patentability. *In re Lowry*, 32 F.3d 1579, 1582, 32 U.S.P.Q.2d 1031, 1034 (Fed. Cir. 1994). Anticipation focuses on whether a claim reads on the product or process a prior art reference discloses, not on what the reference broadly teaches. *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 U.S.P.Q. 781 (Fed. Cir. 1983). Applicant respectfully submits that *Yamanishi* does not identically show every element of the claimed invention arranged as they are in the claims. As amended, *Yamanishi* does not teach or suggest each and every feature as recited in independent claims 1, 13, and 25.

Yamanishi is directed to statistical outlier detection, fraud detection, and fraud detection techniques for detecting an abnormal value or an outlier, which largely deviates from data patterns obtained from multi-dimensional time series data. Degree of outlier of one input data is calculated by an amount of change in a learned probability density from that before learning as a result of taking in of the input data. This is because data largely differing in a tendency from a so far learned probability density function can be considered to have a high degree of outlier. A function of a distance between probability densities before and after data input is calculated as a degree of outlier. A probability density estimation device estimates a probability distribution of generation of unfair data while sequentially reading a large volume of data and a score calculation device calculates and outputs a degree of outlier of each data based on the estimated probability distribution. *Yamanishi* does not teach or suggest each and every feature as recited in amended claims 1, 13, and 25. Specifically, *Yamanishi* does not teach or suggest "identifying a plurality of control points in the historical data, further comprising: identifying a plurality of outliers in a distribution of the historical data; and validating the plurality of outliers to distinguish between a first set of outliers and a second set of outliers, wherein the first set of outliers are classified as valid outliers and the second set of outliers are classified as invalid outliers, and wherein the first set of outliers are identified as the plurality of control points," as recited in amended claims 1, 13, and 25. In addition, *Yamanishi* does not teach or suggest "building at least one data model based on the plurality of control points, further comprising: generating a fence that passes through the plurality of control points to define a boundary between data points, wherein data points within the fence represent acceptable behavior and data points outside the fence represent fraudulent behavior," as recited in amended claims 1, 13, and 25. Additionally, *Yamanishi* does not teach or suggest "identifying one or more new control points based on the updated data, further comprising: identifying an additional plurality of outliers in a distribution of the updated data; and validating the additional plurality of outliers to distinguish between a third set of outliers and a fourth set of outliers, wherein the third set of outliers are classified as valid outliers and the fourth set of outliers are classified as invalid outliers, and wherein the third set of outliers are identified as the one or more new control points; adjusting the at least one data model to form an adjusted data model, within the at least one data model, based on the one or more new control points," as recited in amended claims 1, 13, and 25.

With respect to the rejection of independent claims 1, 13, and 25, the Examiner cited *Yamonishi's* Summary of the Invention as teaching the features of the independent claims. *Yamonishi* provides a degree of outlier calculation device capable of automatically detecting fraud based on data whose fraud is yet to be known (unsupervised data), and a probability density estimation device and a histogram calculation device for use therein. The degree of outlier calculation device adopts an outlier determination criteria that uses a model including short-term and long-term models combined into one. The degree of outlier calculation device realizes in the device an algorithm learning while forgetting past data by weighting less on older data to enable a change in pattern to be flexibly followed. The higher a value of a probability density function, the higher the degree of outlier. *Yamanishi* does not teach or suggest "identifying a plurality of control points in the historical data, further comprising: identifying a plurality of outliers in a distribution of the historical data; and validating the plurality of outliers to distinguish between a first set of outliers and a second set of outliers, wherein the first set of outliers are classified as valid outliers and the second set of outliers are classified as invalid outliers, and wherein the first set of outliers are identified as the plurality of control points," as recited in independent claims 1, 13, and 25. In addition, *Yamanishi* does not teach or suggest "building at least one data model based on the plurality of control points, further comprising: generating a fence that passes through the plurality of control points to define a boundary between data points, wherein data points within the fence represent acceptable behavior and data points outside the fence represent fraudulent behavior," as recited in independent claims 1, 13, and 25. Additionally, *Yamanishi* does not teach or suggest "identifying one or more new control points based on the updated data, further comprising: identifying an additional plurality of outliers in a distribution of the updated data; and validating the additional plurality of outliers to distinguish between a third set of outliers and a fourth set of outliers, wherein the third set of outliers are classified as valid outliers and the fourth set of outliers are classified as invalid outliers, and wherein the third set of outliers are identified as the one or more new control points; adjusting the at least one data model to form an adjusted data model, within the at least one data model, based on the one or more new control points," as recited in independent claims 1, 13, and 25.

In view of the above, Applicant respectfully submits that *Yamanishi* does not teach each and every feature of independent claims 1, 13, and 25, as is required under 35 U.S.C § 102(e). In

addition, *Yamanishi* does not teach each and every feature of dependent claims 2, 7, 14, and 19 at least by virtue of their dependency on claims 1 and 13, respectively. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 2, 7, 14, and 19 under 35 U.S.C § 102(e).

II. 35 U.S.C. § 103, Obviousness

The Examiner has rejected claims 3-6, 8-9, 15-18, and 20-21 under 35 U.S.C. § 103(a) as being unpatentable over *Yamanishi* in view of *Selby et al.* (U.S. Patent Application No. 2004/0039548), hereinafter referred to as *Selby*. This rejection is respectfully traversed.

Claims 4-6 and 16-18 are canceled. As discussed above, *Yamanishi* does not teach each and every feature of independent claims 1 and 13. In addition, *Selby* does not provide for the deficiencies of *Yamanishi* with respect to independent claims 1 and 13. *Selby* does not teach or suggest "identifying a plurality of control points in the historical data, further comprising: identifying a plurality of outliers in a distribution of the historical data; and validating the plurality of outliers to distinguish between a first set of outliers and a second set of outliers, wherein the first set of outliers are classified as valid outliers and the second set of outliers are classified as invalid outliers, and wherein the first set of outliers are identified as the plurality of control points," as recited in independent claims 1 and 13. In addition, *Selby* does not teach or suggest "building at least one data model based on the plurality of control points, further comprising: generating a fence that passes through the plurality of control points to define a boundary between data points, wherein data points within the fence represent acceptable behavior and data points outside the fence represent fraudulent behavior," as recited in independent claims 1 and 13. Additionally, *Selby* does not teach or suggest "identifying one or more new control points based on the updated data, further comprising: identifying an additional plurality of outliers in a distribution of the updated data; and validating the additional plurality of outliers to distinguish between a third set of outliers and a fourth set of outliers, wherein the third set of outliers are classified as valid outliers and the fourth set of outliers are classified as invalid outliers, and wherein the third set of outliers are identified as the one or more new control points; adjusting the at least one data model to form an adjusted data model, within the at least one data model, based on the one or more new control points," as recited in independent claims 1 and 13. Therefore, the combination of *Yamanishi* and *Selby* fails to teach the features of amended

independent claims 1, 13, and 25. Thus, Applicant respectfully submits that the combination of *Yamanishi* with *Selby* does not teach or suggest the features of dependent claims 3, 8-9, 15, and 20-21 at least by virtue of their dependency on claims 1 and 13, respectively. Therefore, any alleged combination of *Yamanishi* with *Selby* not established a *prima facie* case of obviousness based on the prior art. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 3-6, 8-9, 15-18, and 20-21 under 35 U.S.C § 103(a).

In addition to being dependent on their respective independent claims, claims 8-9 and 20-21 also distinguish over the *Yamanishi* reference in view of *Selby* based on the specific features recited therein. With respect to claims 8 and 20, Applicant respectfully submits that *Yamanishi* in view of *Selby* does not teach or suggest that "generating an adjusted fence that passes through the plurality of control points and the one or more new control points to define a boundary between data points, and wherein data points within the adjusted fence represent acceptable behavior and data points outside the adjusted fence represent fraudulent behavior," and similarly *Yamanishi* in view of *Selby* does not teach or suggest "generating an adjusted fence that passes through the plurality of control points to define a boundary between data points, and wherein data points within the adjusted fence represent acceptable behavior and data points outside the adjusted fence represent fraudulent behavior," as recited in claims 9 and 21. In other words, the fence of the present invention is made up of a plurality of line segments that pass through and connect each of the control points. To the contrary, the cited portion of *Selby* shows a graph of the curve that was generated by applying a standard quadratic function to a list of a sample population.

III. 35 U.S.C. § 103, Obviousness

The Examiner has rejected claims 10-12 and 22-24 under 35 U.S.C. § 103(a) as being unpatentable over *Yamanishi* in view of *Lee et al.* (U.S. Patent No. 7,263,506), hereinafter referred to as *Lee*. This rejection is respectfully traversed.

As discussed above, *Yamanishi* does not teach each and every feature of independent claims 1 and 13. In addition, *Lee* does not provide for the deficiencies of *Yamanishi* with respect to independent claims 1 and 13. *Lee* does not teach or suggest "identifying a plurality of control points in the historical data, further comprising: identifying a plurality of outliers in a distribution of the historical data; and validating the plurality of outliers to distinguish between a first set of

outliers and a second set of outliers, wherein the first set of outliers are classified as valid outliers and the second set of outliers are classified as invalid outliers, and wherein the first set of outliers are identified as the plurality of control points," as recited in independent claims 1 and 13. In addition, *Lee* does not teach or suggest "building at least one data model based on the plurality of control points, further comprising: generating a fence that passes through the plurality of control points to define a boundary between data points, wherein data points within the fence represent acceptable behavior and data points outside the fence represent fraudulent behavior," as recited in independent claims 1 and 13. Additionally, *Lee* does not teach or suggest "identifying one or more new control points based on the updated data, further comprising: identifying an additional plurality of outliers in a distribution of the updated data; and validating the additional plurality of outliers to distinguish between a third set of outliers and a fourth set of outliers, wherein the third set of outliers are classified as valid outliers and the fourth set of outliers are classified as invalid outliers, and wherein the third set of outliers are identified as the one or more new control points; adjusting the at least one data model to form an adjusted data model, within the at least one data model, based on the one or more new control points," as recited in independent claims 1 and 13. Thus, Applicant respectfully submits that the combination of *Yamanishi* with *Lee* does not teach or suggest the features of dependent claims 10-12 and 22-24 at least by virtue of their dependency on independent claims 1 and 13, respectively. Therefore, any alleged combination of *Yamanishi* with *Lee* not established a *prima facie* case of obviousness based on the prior art. Accordingly, Applicant respectfully requests withdrawal of the rejection of claims 10-12 and 22-24 under 35 U.S.C § 103(a).

In addition to being dependent on their respective independent claims, claims 10-12 and 22-24 also distinguish over the *Yamanishi* reference in view of *Lee* based on the specific features recited therein. *Lee* is cited for teaching the features of these claims in the following portion:

> In general, there are three categories of information that the scoring model **316** models: the general characteristics of fraudulent orders, individual cardholder behavior and normal customer behavior at the merchant's site. Each of these contributes important variables to an evaluation of the likelihood of fraudulent activity. While methods of perpetration of fraud change frequently, the basic criminal behavior and activity with fraudulent cards is slow to change. As a result, the scoring system **114** contains both dynamic and static components. The dynamic components include "reasonable and customary" account models updated in real-time with each order. The static components include the fraud behavior models maintained and updated as fraud behavior changes, or as

> increased prediction accuracy is achieved. The scoring model **316** is developed by using historical transaction and account information from as many different card issuers and other transaction information sources as possible, which is known as "consortium data."

Lee, column 12, lines 1-19.

This portion of *Lee* does not teach or suggest "determining whether the adjusted data model, within the at least one data model, reached a steady state," as recited in claims 10 and 22 for example. To the contrary, *Lee* teaches a scoring system with both dynamic and static components and using fraud behavior models and "reasonable and customary" account models; both types of models are updated.

IV. Conclusion

It is respectfully urged that the subject application is patentable over the cited references and is now in condition for allowance. The Examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the Examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

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Respectfully submitted,

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